



Summary of Fishery Surveys Worcester Lake, Price County, 2014 - 2015

WDNR's Fisheries Management Team from Park Falls completed fyke netting and electrofishing surveys in 2014 and 2015 to assess the status of important fish populations in Worcester Lake. Fyke netting in October gave us useful information on black crappies. Fyke nets deployed again shortly after the spring thaw targeted northern pike, walleye, yellow perch, and muskellunge. A late-spring electrofishing survey documented the abundance and size structure of largemouth bass and bluegill populations. Annual fall electrofishing surveys began in 2014 to monitor trends in natural recruitment to the walleye population—with no walleye stocking Worcester Lake is one of 14 reference lakes in an evaluation now underway to learn why walleyes are struggling to reproduce successfully in many northern Wisconsin lakes, and what we can do to help them recover. Quality, preferred, and memorable sizes referenced in this summary are based on standard proportions of world record lengths developed for each species by the American Fisheries Society. "Keeper size" is based on known angler behavior.

Survey Effort

On October 7–9, 2014 with water temperatures 50–52°F, we set four fyke nets for two nights (8 net-nights) to intercept fall movements of black crappies. On April 9–15, 2015 we set four fyke nets at locations chosen to intercept early spring spawning species and fished them at five locations for six nights (24 net-nights) when water temperature ranged from 40 to 50°F. We tended fall nets daily, but spring nets were fished over two consecutive nights and tended on alternate days. Comparing measured water temperature with the optimal spawning temperature range of the targeted species, our spring fyke netting was well timed to represent pike, walleye, and perch population status, but spring netting probably ended before muskellunge spawned. With water temperature at 67°F our May 27th electrofishing survey should have coincided with spawning activities of largemouth bass and bluegills. We sampled the entire 2.05 miles of shoreline in 1.15 hour, including 0.51 mile sub-sampled for all species in 0.32 hour. In our fall recruitment surveys we also completed entire shoreline electrofishing circuits, sampling 2.01 miles in 0.82 hour on September 16, 2014 and 2.08 miles in 0.87 hour on September 28, 2015. We dipped gamefish of all sizes while giving priority to capturing juveniles. In fall 2014 water temperature (59°F) was narrowly within the optimal range (50–60°F) for juvenile assessments. By contrast, water temperature was 66.7°F in our fall 2015 survey, remaining above the optimal range through September in regional surveys.

Habitat Characteristics

Worcester Lake is a 100-acre drainage lake, located about 3 miles north of Prentice, WI. Average depth was 12 feet, maximum depth was 37 feet, and 10% of the surface area was less than 3 feet deep. An unnamed stream discharges about 1 cubic foot per second to Hay Creek and then to the South Fork Jump River. Lakebed materials near shore were categorized as 57% gravel, 40% muck-silt, 2% rock-rubble,

and 1% sand. Samples from September 1968 characterized Worcester Lake as a slightly acidic (pH 6.2), soft water lake (methyl purple alkalinity 17 milligrams per liter as CaCO_3). Water clarity was moderately high (Secchi depth = 7 feet), indirectly indicating its “mesotrophic” or mid-range nutrient concentrations and biomass production rates. Submergent and emergent vegetation persisted at moderately high stand density around nearly the entire perimeter through late September 2014 and 2015.

Shoreland vegetation was 35% birch-aspen forest, 62% cedar-spruce-tamarack swamp, and 3% leatherleaf bog. Hackett Township maintains a boat landing with a concrete ramp, boarding dock, and ample parking on the southeast shore. Public road access to the boat landing should follow County Highway K and Worcester Lake Road from the east because the road from south is a private drive with no public thoroughfare. An 835-foot-long channel was excavated landward from the north shore with permit approval granted in 1965. Neither the boat landing, nor the man-made enlargement appears on the 1968 lake map (attached).

Summary of Results

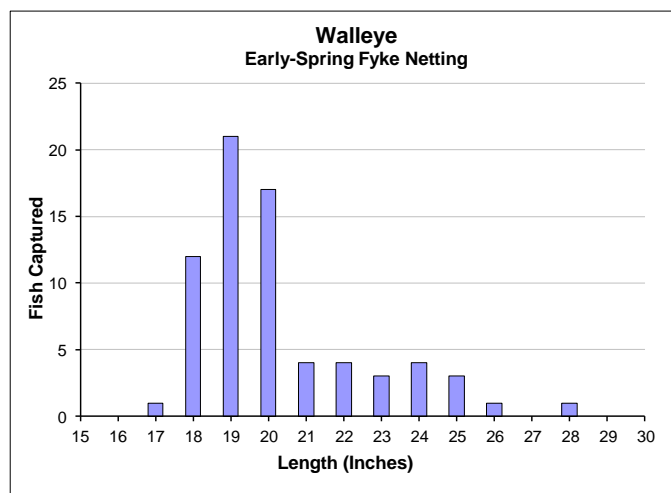
We captured 12 fish species and one hybrid in our electrofishing and netting surveys. Five additional species were collected in three surveys completed in 2000, 2001, and 2006, several of which used gear and methods specifically designed to capture small fish (e.g. miniature fyke nets and towed barge electrofishing transects). Largemouth bass were dominant in the fish community, and walleyes held a secondary role as predators. Smallmouth bass were captured at very low rates by electrofishing in August 1962, May 1992, and spring 2001, and mini fyke nets captured a single age-0 smallmouth bass in August 2006, but we found none in our most recent surveys.

Walleye



Early Spring Fyke Nets

Captured	4.1 per net-night $\geq 10"$
Quality Size $\geq 15"$	100%
Preferred Size $\geq 20"$	52%
Memorable Size $\geq 25"$	7%



The walleyes in our early spring fyke nets are likely the descendants of nearly one million fry stocked in 1937–1941 that have managed to sustain themselves at low population density without further stocking ever since. The absence of small- and intermediate-size walleyes in spring nets suggests that natural recruitment produces year classes sporadically—we captured no age-0 walleyes in our fall 2014 and 2015 recruitment surveys. We estimated walleye population density to be 1.0 adult per acre, based on the ratio of fin-clipped to newly-captured fish after three fyke net lifts (Schnabel method). With limited harvest, low-density walleye populations typically include a substantial proportion of preferred-sized

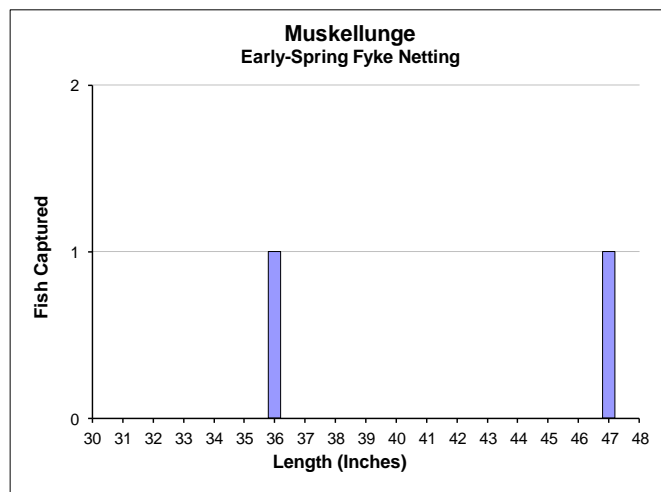
fish 20 inches and longer. Over half of walleyes in our sample were 20 – 28 inches long, and 76% of those are protected by current harvest regulations: “Only three walleyes from 15 inches but less than 20 inches may be kept, except one fish may be over 24 inches.”

Muskellunge



Early Spring Fyke Nets

Captured 0.1 per net-night $\geq 20"$	
Quality Size $\geq 30"$	100%
Preferred Size $\geq 38"$	50%
Memorable Size $\geq 42"$	50%



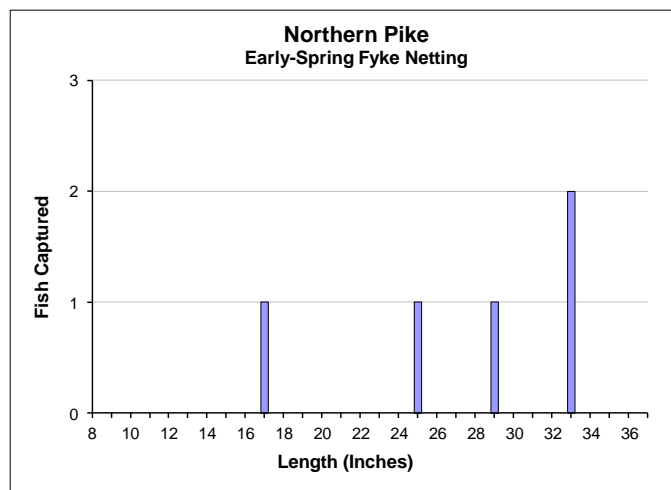
The two muskellunge in our early spring fyke nets were the first records of this species captured in Worcester Lake surveys. The smaller was a 36.7-inch tiger muskellunge, a naturally-occurring hybridization of northern pike and muskellunge that always produces sterile males, but often fertile females. We have no record of muskellunge ever being planted into Worcester Lake. Though they probably do not constitute a viable musky population, these individuals may have originated from unauthorized stocking, or perhaps they emigrated from downstream waters where muskies are more common. Hay Creek and the South Fork Jump River have no permanent barriers to fish movement between Worcester Lake and the Chippewa River.

Northern Pike



Early Spring Fyke Nets

Captured 0.2 per net-night $\geq 14"$	
Quality Size $\geq 21"$	80%
Preferred Size $\geq 28"$	60%
Memorable Size $\geq 34"$	0%



Northern pike were absent in the 1949 and 1962 surveys. Beginning in 1992, however, pike of all sizes were consistently collected in most surveys at netting and electrofishing capture rates that we associate with low population abundance (mean 0.19/net-night; range 0.13–0.24; n=5 and mean 7.4/hour; range

1.2–17; n=6). Although small sample size in all surveys limits our confidence in assessing population size structure, preferred-size pike ≥ 28 inches long were represented only in spring 2015 fyke nets and absent from all other collections. Pike in low abundance should be able to avoid crowding and competition to maintain satisfactory growth.

Yellow Perch

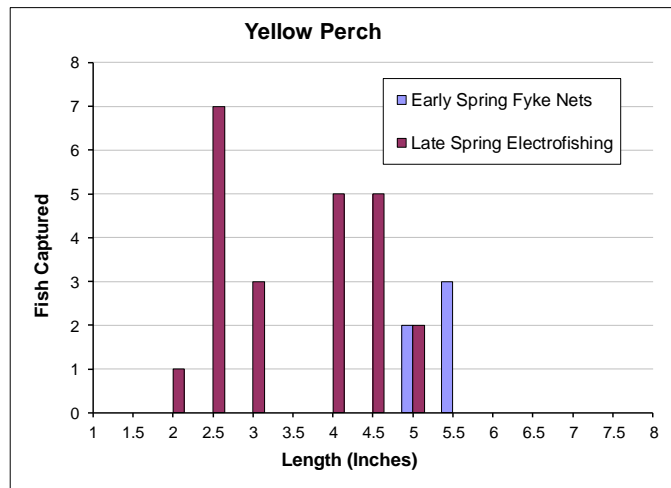


Early Spring Fyke Nets

Captured	0.3 per net-night $\geq 5"$
Quality Size $\geq 8"$	0%

Late Spring Electrofishing

Captured	3.9 per mile or 6.3 per hour $\geq 5"$
Quality Size $\geq 8"$	0%



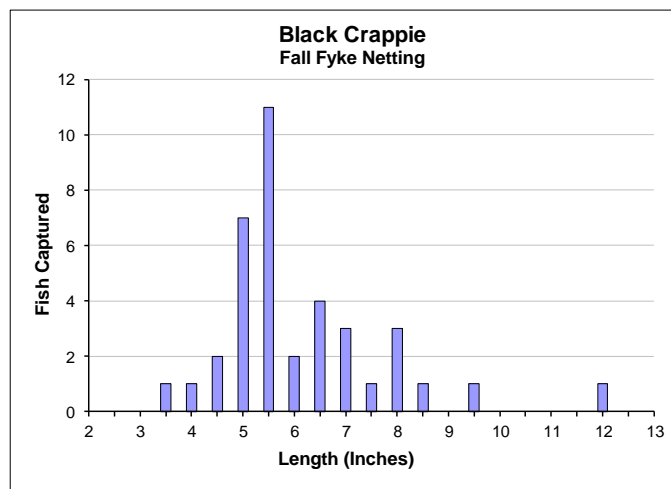
Early spring fyke netting and late spring electrofishing revealed the importance of yellow perch as the favorite food of largemouth bass, walleye, and northern pike. But our surveys also show that perch offer no value to anglers who want to keep and eat some fish. Aside from one 10½-inch perch captured by electrofishing in fall 2006, the netting survey in summer 1949 recorded the last quality-size perch at least 8 inches long captured in Worcester Lake surveys. With such a long history of consistently disappointing size structure, it would be unrealistic to expect that perch fishing here will ever improve.

Black Crappie



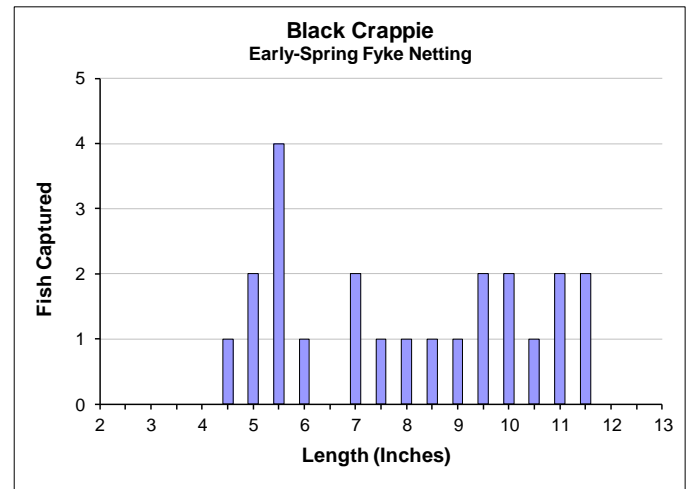
Fall Fyke Nets

Captured	4.4 per net-night $\geq 5"$
Quality Size $\geq 8"$	20%
Preferred Size $\geq 10"$	6%
Memorable Size $\geq 12"$	6%



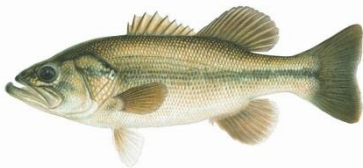
Early Spring Fyke Nets

Captured 1.2 per net-night $\geq 5"$	
Quality Size $\geq 8"$	55%
Preferred Size $\geq 10"$	32%
Memorable Size $\geq 12"$	0%



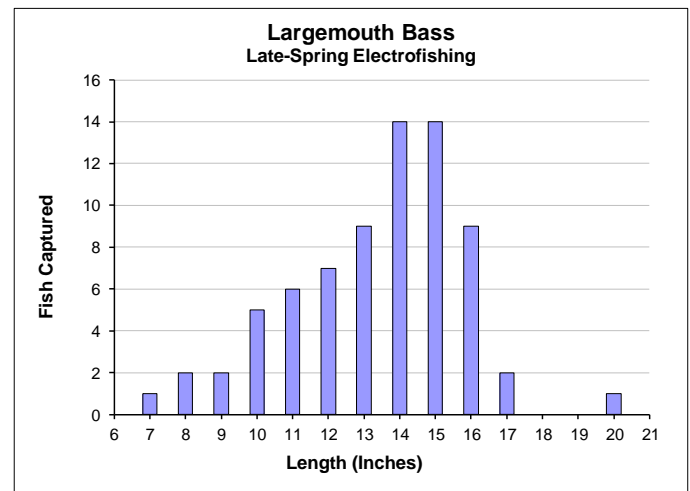
The capture rates of black crappie in fall and early spring fyke nets both point towards moderately low abundance. Both samples had crappies in a wide range of sizes, suggesting that the population has produced successive cohorts in the last 6–8 years. Early spring nets included a higher proportion of fish 10 inches and longer compared to fall nets. Though we did not collect bony structures to estimate their age and analyze their growth, the length distributions of our samples indicate that at least some crappies live long enough to approach or attain memorable size.

Largemouth Bass



Late Spring Electrofishing

Captured 35 per mile or 62 per hour $\geq 8"$	
Quality Size $\geq 12"$	79%
Legal Size $\geq 14"$	56%
Preferred Size $\geq 15"$	37%



Our electrofishing capture rate of largemouth bass in early spring reflects moderately high population abundance, but not so high that crowding and intense food competition severely impairs their growth and prevents bass from attaining the sizes that anglers like to catch. Nearly a fifth of the bass in our sample were at least 16 inches long, and we caught one 20-inch, memorable-size bass. We did not analyze growth of largemouth bass in Worcester Lake, so we cannot speculate whether most bass die soon after they reach 16 or 17 inches, or if they grow at a near-average rate and the population has a larger share of 17- to 20-inch fish than our electrofishing survey revealed.

Bluegill



Early Spring Fyke Nets

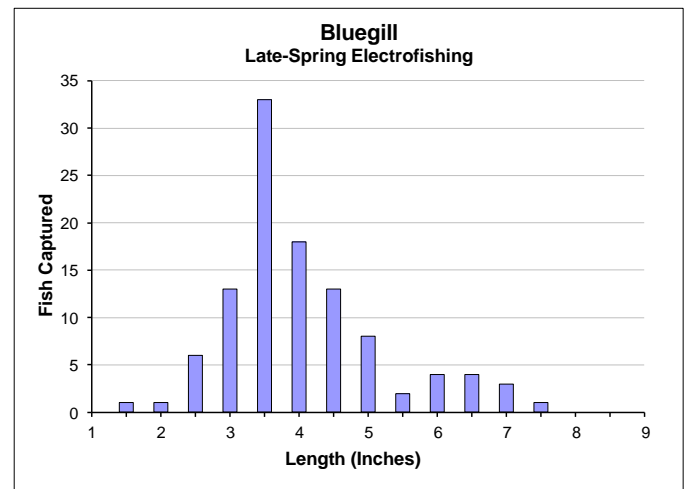
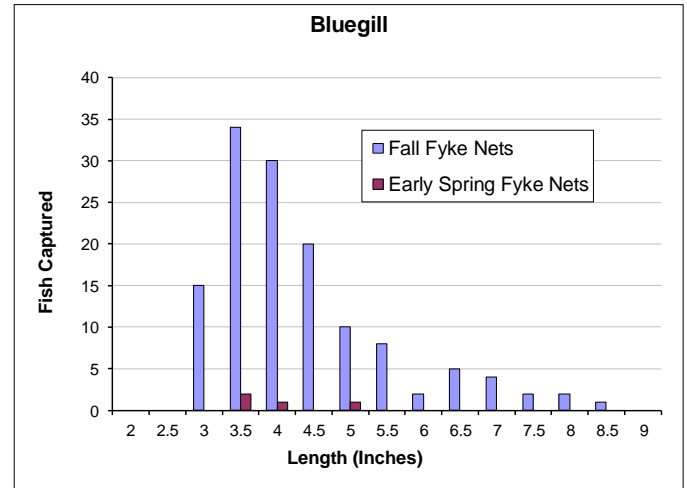
Captured	2.6 per net-night $\geq 3"$
Quality Size $\geq 6"$	0%

Fall Fyke Nets

Captured	17 per net-night $\geq 3"$
Quality Size $\geq 6"$	12%
Keeper Size $\geq 7"$	7%
Preferred Size $\geq 8"$	2%

Late Spring Electrofishing

Captured	194 per mile or 309 per hour $\geq 3"$
Quality Size $\geq 6"$	12%
Keeper Size $\geq 7"$	4%
Preferred Size $\geq 8"$	0%



Capturing only mediocre-size bluegills at a relatively high rate by electrofishing in late spring suggests that the combined influences of predation by largemouth bass and walleyes and the self-regulating social mechanisms that can help to limit bluegill reproduction were ineffective at maintaining the bluegill population at the low to moderate levels of abundance that are necessary to assure satisfactory bluegill growth and favorable proportions of the sizes that anglers like to keep. Though late spring electrofishing is our chosen method for assessing bluegill population status, fyke nets sometimes detect the larger bluegills that are not represented in our electrofishing surveys. However, early spring netting captured very few bluegills, and fall netting revealed low proportions of keeper- and preferred-size bluegills in Worcester Lake. Unless largemouth bass and walleye abundance increases enough to apply more predatory pressure on bluegills, it is unlikely that bluegill size structure will improve.

Survey data collected and analyzed by: Jeff Scheirer, Evan Sniadajewski, and Jeanette Wendler—WDNR Fishery Team, Park Falls.

Written by: Jeff Scheirer—Fishery Biologist, February 4, 2016.

Reviewed and approved for web posting by: Mike Vogelsang—Northern Administrative District Supervisor, February 2016.

LAKE SURVEY MAP

WORCESTER
LAKE

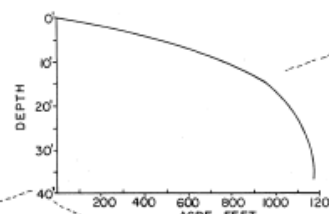
PRICE
COUNTY

SEC. 23

T. 36 N. R. 1 E.



Department of Natural Resources
B.M. 'X' is a bronze tablet on the E. side
of lake 94' S.E. of center line of
Worcester lake Road and 10' S.W. of
a power pole
Assumed elev. 100.00'
Water elev. 92.25'

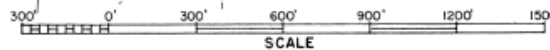


SPECIES OF FISH		
	Abundant	Present
Muskie		
N. Pike		
Walleye	X	
L.M. Bass	X	
S.M. Bass	X	
Panfish	X	
Traut		

EQUIPMENT RECORDING SONAR MAPPED SEPT. 1968
MO. YR.

- TOPOGRAPHIC SYMBOLS**
- (B) Brush
 - (PW) Partially wooded
 - (W) Wooded
 - (C) Cleared
 - (P) Pastured
 - (A) Agricultural
 - B.M. Bench Mark
 - Dwelling
 - Resort
- LAKE BOTTOM SYMBOLS**
- P. Peat
 - Mk. Muck
 - C. Clay
 - M. Marl
 - Sd. Sand
 - St. Silt
 - Gr. Gravel
 - R. Rubble
 - Br. Bedrock
 - T. Submergent vegetation
 - Emergent vegetation
 - Floating vegetation
 - Stumps & Snags

WATER ELEV. 92.25'



Access Access with Parking Boat Livery
Field work by: C. Busch, C. Olson, L. Sather Drawn by: C. Hall

AREA 100.00 ACRES
UNDER 3 FT. 10 %
OVER 20 FT. 17 %
VOLUME 1175.50 ACRE FT.
TOTAL ALK. 17 P.P.M.
SHORELINE 2.03 MILES
MAX. DEPTH 37 FEET